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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/723,016	11/26/2003	Ralph B. Danzl	P0010462.00	1783
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MEDTRONIC, INC. 710 MEDTRONIC PARKWAY NE MINNEAPOLIS, MN 55432-9924				
			EXAMINER	
			KAHELIN, MICHAEL WILLIAM	
			ART UNIT	PAPER NUMBER
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

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Office Action Summary	Application No. 10/723,016	Applicant(s) DANZL ET AL.	
	Examiner Michael Kahelin	Art Unit 3762	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 September 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 6-25 is/are pending in the application.
- 4a) Of the above claim(s) 13-25 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 6-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 22-25 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 9/26/2007 has been entered.

Election/Restrictions

2. Newly submitted claims 22-25 directed to an invention that is independent or distinct from the invention originally claimed for the following reasons:

3. Inventions II (claims 22-25) and I (claims 1-4 and 6-12) are related as combination and subcombination. Inventions in this relationship are distinct if it can be shown that (1) the combination as claimed does not require the particulars of the subcombination as claimed for patentability, and (2) that the subcombination has utility by itself or in other combinations (MPEP § 806.05(c)). In the instant case, the combination as claimed does not require the particulars of the subcombination as claimed because the combination does not require a transistor having a trench. The subcombination has separate utility such as use in a system not having solder bumps, such as one with flush, planar connections.

The examiner has required restriction between combination and subcombination inventions. Where applicant elects a subcombination, and claims thereto are subsequently found allowable, any claim(s) depending from or otherwise requiring all the limitations of the allowable subcombination will be examined for patentability in accordance with 37 CFR 1.104. See MPEP § 821.04(a). Applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claims 22-25 are withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 1-4, and 6-12 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 1's "high voltage termination region" is inferentially included and it is unclear whether Applicant is positively reciting this element

or functionally reciting it. As this element is not a positively recited element, the further limitations imposed by claims 3, 4 and 6-12 are vague because it is unclear whether this element is actually part of the claimed invention. The Examiner has considered this to be a positively claimed element, and claim 1 should be amended accordingly.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

8. Claims 1-4 and 6-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nishi et al. (US 5,949,140, hereinafter "Nishi").

9. In regards to claims 1 and 10, Nishi discloses the essential features of the claimed invention including a semiconductor substrate (Fig. 6(b), element 58); an

epitaxial layer overlying the substrate (60, 62, 64, 66, and 68); a power transistor (Fig. 2(a), element 32) formed in the epitaxial layer having a first electrode (36), a control electrode (34), and second electrode (38); a backside contact (54); a deep trench (42) etched outside a high voltage termination region (Figs. 2(a) and 2(b); the trench (42) is away from the high voltage termination regions (terminals) 38); and a first electrode contact region (36a). Nishi does not disclose that the breakdown voltage is greater than 100 volts or that the transistor is used in an implantable medical defibrillator having a housing. It is well known in the implantable device arts to utilize a transistor, such as the one taught by Nishi, in implantable defibrillators having housings and using a breakdown voltage greater than 100 volts to provide the predictable result of providing fast, solid-state switching from low voltage batteries to high voltage therapy circuits, in a device protected from corrosive body fluids. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Nishi's invention by utilizing the transistor in an implantable defibrillator having a housing and using a breakdown voltage greater than 100 volts to provide the predictable result of providing fast, solid-state switching from low voltage batteries to high voltage therapy circuits in a device protected from corrosive body fluids.

10. In regards to claim 2, Nishi discloses a plurality of transistors in parallel in an active area (Fig. 2(a), elements 32).

11. In regards to claim 3, the high voltage termination region (38) surrounds the active area region (Fig. 2(a); elements 32).

12. In regards to claim 4, Nishi discloses the essential features of the claimed invention except for a substrate having a lower resistivity than the epitaxial layer. It is well known in the semiconductor arts to provide transistors with a substrate having a lower resistivity than the epitaxial layer to provide the predictable result of optimizing the device's high voltage performance. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Nishi's device by providing a transistor with a substrate having a lower resistivity than the epitaxial layer to provide the predictable result of optimizing the device's high voltage performance.

13. In regards to claim 6, a second electrode couples to the active region (36).

14. In regards to claim 7, a control electrode overlies the epitaxial layer (34).

15. In regards to claims 8 and 9, Nishi discloses the essential features of the claimed invention except solder bumps for the electrode contact regions (such as those shown in Fig. 1). It is well known in the electronic arts to provide circuit components within a housing with solder bumps to provide the predictable result of allowing ease of connection during manufacturing. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Nishi's invention by providing a transistor with solder bumps within a housing to provide the predictable result of allowing ease of connection during manufacturing.

16. In regards to claim 11, the device comprises a metal layer coupled to an exposed surface of the substrate (54).

17. In regards to claim 12, the device comprises a trench including a conductive layer formed on the side and bottom of the trench (Fig. 6(b)).

18. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Aiello et al. (US 2003/0213605, hereinafter "Aiello") in view of Brendel et al (US 2003/0213605, hereinafter "Brendel"). Aiello discloses the essential features of the claimed invention including a semiconductor material that has an epitaxial layer that contains two electrodes and a vertical power transistor that has a collector electrode and a metal track that is in contact with the base region and emitter region (see column 3, lines 41-53). Aiello et al. disclose the transistor has a high breakdown voltage, typically greater than 200V (see column 2, lines 43-49). Aiello et al. do not disclose the deep trench exposing the substrate. Brendel et al. disclose the trench and a first electrode contact region (see figure 20) to provide the predictable result of improved contact of the electrode and ease of manufacturing. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to combine the semiconductor device taught by Aiello with the deep trench exposing the substrate, as taught by Brendel, to provide the predictable result of providing improved contact of the electrode and ease of manufacturing.

Response to Amendment

19. The declaration filed on 11/26/2007 under 37 CFR 1.131 has been considered but is ineffective to overcome the Brendel reference. The evidence submitted is

insufficient to establish a reduction to practice of the invention in this country or a NAFTA or WTO member country prior to the effective date of the Brendel reference. The declaration is lacking a statement establishing where the reduction to practice occurred (e.g., in the U.S., etc.), and the evidence provided lacks a showing of the structural features of the claimed invention (e.g., vertical current flow, "backside contacts," "at least one deep trench," etc.).

Response to Arguments

20. Applicant's arguments filed 9/26/2007 regarding claim 1 have been fully considered but they are not persuasive. The Examiner maintains the position presented in the Advisory Action of 6/18/2007. Additionally, new grounds of rejection for claims 1-4 and 6-12 are presented above in view of new art and the amendment to claim 2.

Conclusion

21. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Comeau et al. (US 6,657,274) is one of many teachings of utilizing a high voltage transistor in an implanted defibrillator having a housing; Benson (US 4,823,796) is one of many teachings of utilizing a transistor having a breakdown voltage of more than 100V; and Adamic, Jr. (US 6,124,179) is one of many teachings of utilizing an epitaxial layer having a high resistivity.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kahelin whose telephone number is (571) 272-8688. The examiner can normally be reached on M-F, 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Angela Sykes can be reached on (571) 272-4955. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MWK

MWK
11/27/07

GEORGE R. EVANS
PRIMARY EXAMINER

11/20/07